Designerly ways of being

Josh Tenenberg

University of Washington Tacoma, Tacoma, USA
jtenenbg@uw.edu

David Socha

University of Washington Bothell, Bothell, USA
socha@uw.edu

Wolff-Michael Roth

University of Victoria, Victoria, Canada
wolffmichael.roth@gmail.com

Abstract*: In this paper, we inquire into the stances that designers take in their design activities. The setting in which we investigate this question is that of design critiques, where participants make their stances publicly available to one another. During a critique, participants use their bodies as a framework for mutual orientation and reference. Design concepts are not so much told as they are staged and performed, using multiple semiotic modalities, including gesture, speech, gaze, orientation, inscription, and artifact. In performing their design, participants adopt and shift between several identified stances, which we call inscriptional, third-person, first-person and phenomenal. During the critique, designers often mirror the stances of others, where failing to do so can lead to communication breakdown. Although analyzed in the social setting of the design critique, because these stances are made public, they can thus become internal resources that designers draw upon in design situations in which others are not present. Rather than representing epistemic states or "designerly ways of knowing," we suggest that these stances represent "designerly ways of being."*

Keywords: Design stance; embodiment; gesture; design critique

> *One's own body is in the world just as the heart is in the organism: it continuously breathes life into the visible spectacle, animates it and nourishes it from within, and forms a system with it.* (Merleau-Ponty, 2012, p. 209)

The purpose of this paper is to inquire into the different stances that designers take in their design activities. We situate our work within research that has recently been undertaken that conceptualizes design as interpretation (Glock, 2008), with its focus on the ways in which design participants discursively organize their activity through the fine-grained analysis of speech-in-interaction (Fleming, 1998; Glock, 2009; Luck, 2009; Oak, 2009). Under-examined in this literature, however, are the ways in which the participants' use their bodies, in conjunction with speech, inscriptions, artifacts and other material resources in their environment, to constitute their interactional work—though see (Lymer, 2009; Murphy, Ivarsson, & Lymer, 2012; Murphy, 2005; Oak & Lloyd, 2014) for promising research in this direction. Given the materiality of the artifacts that result from design activities in a large number of design disciplines, it is noteworthy that the materiality of the body is so often taken for granted, for, as Robertson points out, "the physical world and the physical body are made of the same stuff" (Robertson, 2002, p. 308). We might therefore expect that as part of their design activities, designers would use (parts of) their own bodies to stand in for the materials of design, the objects of design, and/or the users of design. If so, this embodied *experiencing* of design is important to understand in order to better understand and characterize the *process* of designing. Through their stances, designers thereby literally enter the world of their design artifacts and take a position with respect to their creation. This aligns with Nelson and Stolterman's definition of design as "the ability to imagine that-which-does-not-yet-exist, to make it appear in concrete form as a new, purposeful addition to the real world" (2003, p. 9), and with the importance of focusing on the *experience* of a person while using a designed artifact (Buxton, 2007). In this study, we identify the different stances designers take, and how these stances change in the course of design activity.

Rather than taking a static or mentalistic view of design stances, asking designers to think-aloud while designing, or eliciting a retrospective description of their experience, we examine the stances that designers take when in interaction with one another during a *design critique*. Design critiques have long been recognized as important locations in which design learning occurs. Emerging from the studio tradition in fields such as architecture (Anthony, 1991; Oh, Ishizaki, Gross, & Do, 2013), graphic design (Dannels, 2005), and industrial design (Oak, 2000), design critiques are common elements in design education. Critiques are also emerging in disciplines without studio-based pedagogical traditions, such as computer science (Hundhausen, Fairbrother, & Petre, 2011) and engineering (Regan, Dally, Cunniff, Zhang, & Schmidt, 2001). Common across the different settings and disciplines in which they occur is the focus on discussions of designs that students have created, mediated by inscriptions and/or artifacts. In addition to the student designer, participants in these discussions include one or more of peers, teachers, expert practitioners, and other design stakeholders.

Design critiques are a fertile site for investigating design stances because of the normative obligations of design students to communicate their design concepts to others and for the design critics to critique these design concepts (Murphy et al., 2012). That is, in order to achieve mutual intelligibility, designers must make their conceptions of design publicly available to one another through multiple semiotic modalities: speech, gesture, gaze, orientation, inscription, and artifact.

Due to their social nature, then, critiques provide a natural setting in which stances can be enacted and displayed.

Our paper proceeds as follows. In the next section, we conceptualize the design critique as a particular kind of setting in which participants use their bodies to provide a frame for orientation and reference to the objects of focus in the environment and to one another. Not only do participants in a critique tell about a design concept, they perform it for one another. We then provide a detailed examination of speech-in-interaction and the accompanying semiotic resources used in three cases drawn from our data sources. We use these for identifying design stances, demonstrating the movement from one stance to another, and showing how participants respond to, mirror, and sometimes fail to mirror the stances of others. Following these, we discuss how the design stances, though identified in a particular social setting, also characterize the more general case of designers in interaction with a design situation, whether alone or with others. In conclusion, in contrast to a conception of design as mentalistic activity, as "designerly ways of knowing" (Cross, 2006), we argue that these stances demonstrate the importance of "designerly ways of being" in design activity.

1. Designing and Participation Frameworks

Groups in interaction use their speech, bodies and the material environment to frame their communicative activities. This kind of mutual, embodied practice among the participants who are physically or technologically co-present to one another is what Goodwin and Goodwin (2004) call a *participation framework,* a term first coined by Goffman (1979). These frameworks provide common ground for mutual attention, orientation, and reference, sometimes literally "grounding" the communicative activity, as when archaeologists squat down to mutually examine and discuss a patch of dirt for purposes of classification (Goodwin, 2000). Goodwin (2007) illustrates the ways in which participants in a gathering form an "ecological huddle" (Goffman, 1964, p. 135), bodily surrounding materials of joint work and orienting to both these materials and one another in a variety of settings: a father and daughter discussing the daughter's homework, surgeons encircling a person being operated on, archaeologists pointing to and gazing at a field book in which they record measurements, and chemists bent over and monitoring a vat of chemicals.

Following Glock (2008), we conceptualize design critiques as a particular kind of participation framework. Cardella et al. (2014) use different terminology to describe the same phenomenon, noting how an instructor constitutes a design critique within a lab setting by his physical positioning in relation to the other participants. "Through directing his talk to and his bodily orientation toward all of the members of the immediate scene, he includes them in his design critique" (p15). As we describe in the next section, we analyzed design critiques in both undergraduate and graduate industrial design courses. Figure 1 illustrates the participation framework in design critiques for the undergraduates. The framework is bounded by the bodies of the student presenter at the front of the classroom and the expert design practitioners sitting nearby on the other side of the table facing the student. The primary objects of discussion are on the table, which serve as a staging area for mutual orientation. These include foam models, one of which is held by one of the practitioners and to which the student is pointing, as well as three boards containing design drawings that face the practitioners. This framework, however, can change: expanding, shrinking, and shifting as the participants shift their alignment to attend to different materials in the environment. For instance, it is common for participants to orient to the

projected inscriptions on the screen behind the student, thereby extending the framework to include these inscriptions.

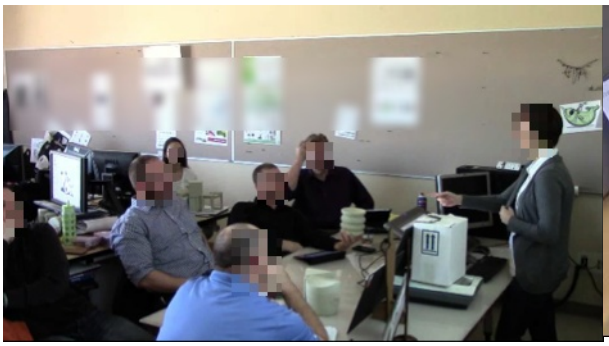


Figure 1: Participation framework for undergraduate students

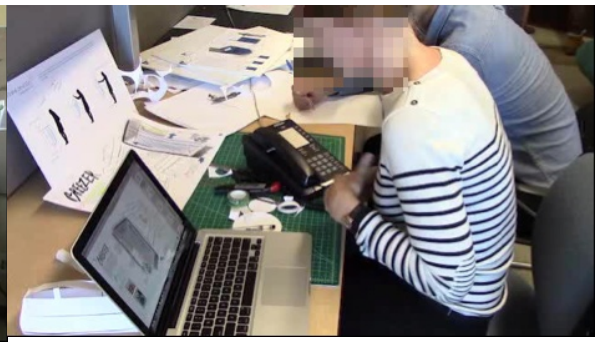


Figure 2: Participation framework for graduate students

Figure 2 illustrates the participation framework for the graduate student critiques. The frame is bounded by the student presenter's body, the laptop in front of her, the storyboard with the design concept on the table, and the telephone on her right providing a link to the bodies, telephone, and computer of the remote critics who complete the frame.

During a design critique, students do not merely share, present, or tell about their design concepts. In describing design critiques, Fleming (1998, p. 48) notes how students establish mutual attention to physical features of a designed object, made salient through coordinated speech, gesture, and gaze, characterizing this as "*performing* the object [emphasis in original]." The participation framework can thus be seen as a stage on which the participants use a variety of semiotic resources that they create (e.g. speech, gesture, gaze) and that are present in the environment (e.g. projected images on a screen, concept boards, foam design models) for performative purposes. This kind of staging and performing is also characteristic of skilled lecturers in classrooms, who similarly use their bodies to enact objects and processes around which the learning is focused (Ardenghi & Roth, 2010).

Performers use meta-communicative elements to establish the beginnings and endings of performances, and to provide the frame for understanding the kind of performance that the speaker is establishing so that the audience can appropriately interpret what is spoken. "All framing … including performance, is accomplished through the employment of culturally conventionalized metacommunication" (Bauman, 1975, p. 295). Given the conventionality, the typified forms of presentation, we can view these design critiques as a special kind of *speech genre* (Bakhtin, 1986; Dannels, 2005). As Dannels (2005) points out, these oral speech genres are locally situated, in that what it means to be a skilled participant in a design critique is determined within each local setting.

2. Staging and Performing Design

In this section, we provide detailed description and analysis of three cases excerpted from the analyzed critiques that demonstrate the shifting stances of the designers. The first case shows how a designer shifts her stance in performing a design artifact to remote critics, demonstrating each of four identified stances. In our second case, we provide a close analysis of face-to-face

interaction between designer and critic, which shows how these participants build on and mirror one another's stances. In our third case, a designer limits his range of stances taken, which leads to resistance and non-acceptance on the part of the design critics. We precede these cases with a brief ethnography of the setting in which the design critiques were enacted.

1.1. Ethnography of Design Critique in University-level Design Courses

The data analyzed in this paper are drawn from the DTRS 10 dataset (Adams & Siddiqui, 2013). The sources analyzed are audio-visual recordings of the design critiques of students in industrial design in which expert design practitioners are key participants. Audio-visual recordings of design critiques were gathered in two different courses: undergraduate students at the junior level, and graduate students. The brief for the undergraduate course is to design "impromptu seating" for private offices, shared workspaces, breakout areas, or lounges, "accessories that can bring excitement to the office." Participants in each undergraduate design critique included a student, the instructor, and two industrial designers: a product group manager, and a lead engineer from the furniture manufacturing organization that served as a client for the course. The recording shows a few other people in the classroom where the critiques took place, though these other people are outside the participation frames. The dataset contained recordings of critiques of seven undergraduate students presenting to expert design practitioners, ranging in length from 4'52" to 7'14".

The design brief for the graduate course called for students to "explore the laundry process for homeowners, specifically focusing on the laundry procedure outside of the 'laundry appliances'. They [students] will develop concepts and designs that help enhance the experience." Participants in each graduate design critique included a student, whose designs were critiqued, another student assisting as a note taker, and two practicing designers from a manufacturer of laundry appliances. Because of weather conditions, the participants were not all collocated; rather, the student being critiqued was at one location in front of a table that contained a computer, large storyboards illustrating design concepts, and a telephone through which the student talked with the remote designers, with the note taker sitting beside the presenting student (see Figure 2). The professional designers were at a remote location, presumably collocated, with a telephone and computer. The presenting student used the computer to display a sequence of images representing his or her design concepts, which were also displayed on the designers' remote computer using a what-you-see-is-what-I-see (WYSIWIS) (Stefik, Bobrow, Foster, Lanning, & Tatar, 1987) system for collaborating at a distance. Audio-visual recordings of these critiques are only available depicting the student site. The dataset contained recordings of design critiques of five graduate students presenting to expert design practitioners, ranging in length from 8'49" to 15'14".

In addition to the arrangement of bodies that constitute the participation framework described above, there are other elements of these critiques that are conventionalized with respect to the local culture of the particular classrooms studied. For example, each undergraduate design critique begins with the professional practitioners and instructor already seated at the table, with the student walking from the audience area to the front of the room carrying his or her three concept boards horizontally (containing design sketches) on which three corresponding foam models are placed. On arriving at the front of the room, the models are set on the table and the concept boards are leaned so as to face the audience. The student moves to the computer to display his or her sketches on the screen at the front of the room (behind the student). The student faces the audience, checking the display at the front of the room or the computer monitor

on the table and states his or her name. Similarly, there are conventionalized elements marking the performance in the graduate student critiques, though, as with the undergraduates, there are also expressive elements specific to each individual.

1.2. Stances and Progressions

During the design critique, the participants change their physical alignment, orientation, gesture, voice, and direction of gaze. In so doing the participants signal a shift in what Goodwin (2007) calls *stance*: "such arrangements are physically constituted through how participants mutually position their bodies toward each other and the environment that is the focus of their work" (2007, p. 61). In this section, we characterize the primary stances of the participants during the design critiques that we analyzed.

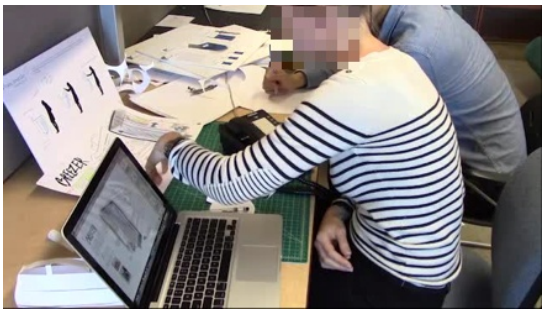
In the sources analyzed, we identified four stances taken by both student and professional designers: the *inscriptional*, *first-person, third-person,* and *phenomenal* stances. Each stance is defined by the way in which designers position themselves—through speech, body orientation, gesture, and gaze (Roth & Lawless, 2002)—with respect to the artifacts (inscriptions and material things) and enclosing frame of the participant framework. During the design process or during a design presentation/critique, a designer may move through a progression of these stances. We exemplify these stances with materials from the design critique involving Mylie[1].

Mylie is a graduate student; her participation in a critique occurs with non-collocated critics, mediated by telephone and the remote sharing of her computer display. Filling the display of the laptop in front of Mylie is an image of a design concept that she is discussing (Figure 3). The centerline of her body is at the right-hand edge of the laptop. Between the phone and the laptop, but a bit behind each is a large sheet of paper that contains the left half of the image displayed on the laptop but at approximately double the size. Mylie's body and head are oriented to the paper image. Much of this image is the drawing of what looks like a closet, with large blue arrows into and up the "closet".

After a brief (22 second) introduction summarizing what she will be discussing, Mylie begins to articulate a design concept called the *Breezer,* a term that can be found in the top-left corner of the image. The Breezer was motivated by research that Mylie did earlier indicating that people often have clothes that they want to wear multiple times and are not ready to wash. Her concept is to have a place to put these clothes[2]. The speaker throughout the transcripts is Mylie.

1.1 so to kind of (.) ha (.) facilitate for that um (.) here is uh (.) uh (.) a compartment uh idea mm at the moment its kind of um (.) uh (.) like a a closet function so it can actually exist either in the (.) in the hallway or in a in a walk-in closet or (.) so it can be located anywhere (.)

1.2 ((moves index finger of left hand to point to bottom arrow on the paper drawing))
but the function is (.) ((moves hand along bottom of paper))



Mylie focuses the critics on the "compartment" comparing it to a closet, not in its location ("it can be located anywhere") but in its "function". As Mylie speaks, she orients to the paper image, grazing the top of the image with her open hand, moving it back and forth. Her gesture places her "on the inscription," synchronized with her discussion of the artifact's function that she is designing. Drawn in perspective in two dimensions, this image depicts a scenario of artifact use within the larger ecology of the home, with the Breezer compartment placed inside a walk-in closet, clothes hanging just outside the Breezer and a person opening a drawer nearby. The drawing is not only annotated with details of the design to be made salient (e.g. "the bottom is a SHOE RACK"), it also includes notes from her research that motivate the design ("this box is for the clothes which I wear once or twice but still don't need to wash") and the larger design purpose ("to maintain the cleanliness of daily clothes and prolong their lifespan"). This inscription, then, can be viewed as a symbolic abstraction representing her larger design concept, and her gesture in relation to it indicates her positioning within this abstract space.

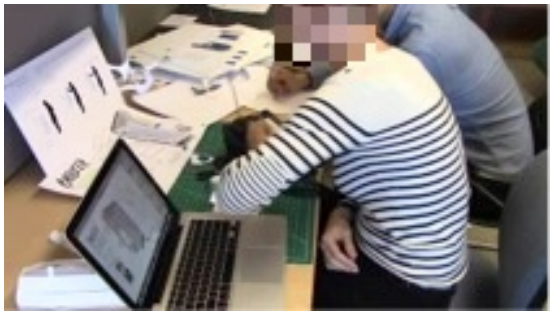
Figure 3: Breezer

In this part of her presentation, Mylie's orientation is determined by the two-dimensionality of the design drawing. Her hand gestures point to or follow the traces on the paper or computer screen. In the same way that research identified physics (Ochs, Jacoby, & Gonzales, 1994) or environmentalist presenters (Roth & Lawless, 2002) as metaphorically journeying through the inscriptions, Mylie takes her audience, the two design critics on the other end of the telephone line, through the two dimensional space she has created and made available to them. Because of this determination of events by the inscription, we denote the stance taken as the *inscriptional stance*. In this stance, the designer orients and makes reference to sketches and diagrams, whether projected on the screen, printed on paper, or displayed on a computer monitor. The inscriptional stance orients "to the page," which generally abstracts or "filters" a number of design features so that only particular characteristics of the design (such as shape and form) are made salient (Lim, Stolterman, & Tenenberg, 2008). This orientation is signaled by verbal reference to parts of an inscription, deixis or gaze orientation to an inscription, and/or moving the hand over or in relation to an inscription.

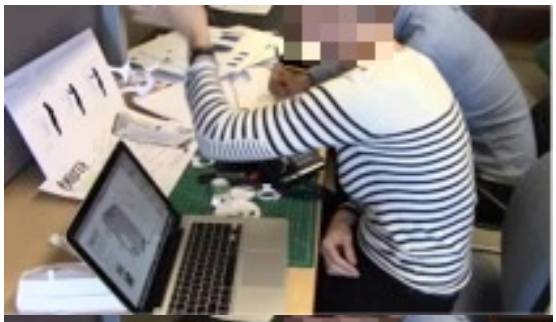
As she continues in the next utterance, she moves off the page and into a 3-dimensional space. Throughout the six seconds of the fragment illustrated in 1.3–1.6, Mylie iconically gestures with her left hand. Her left hand moves from the center of her body (turn 1.3) up and outward in a

vertical direction (turn 1.4), mirroring the vertical blue arrow in her drawing that represents air moving up the interior of the Breezer compartment (see Figure 3). The hand continues in a movement back to her body (turn 1.5), setting itself up to produce the outward movement (turn 1.6) that corresponds to the outward movement of the air she simultaneously describes. At the same time, this gesture is coordinated with her narration about "the air" that "slides … through the closet." Inscription, gesture, and speech are thus all coordinated so that her hand and arm can be seen to enact the airflow. They embody not the compartment itself, but make iconic the dynamic interaction with the physical world that this artifact sets in motion and which is its essential property. With this gesture, Mylie takes the kind of perspective that a person (such as the one illustrated in the right-hand side of her concept sketch) might have when viewing the Breezer, from the outside looking in, the perspective of a person who might approach and hang or retrieve clothes from the Breezer. From Mylie's seated position, she can simultaneously view her paper drawing on the horizontal surface of the desk, the digitized image on the nearly vertical surface of her laptop screen, and her hand and arm in front of her body moving in 3-space. The design, then, is "out there," in front of her, while she stands at the edge of the frame looking in.

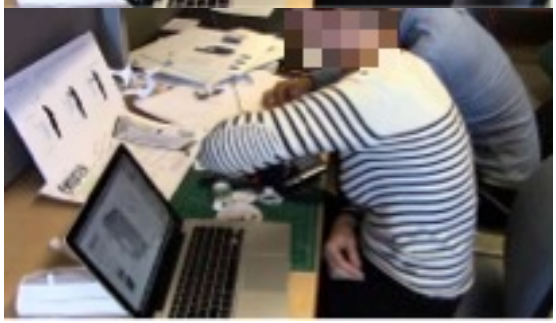
1.3 uh effectively that it pulls air in (.)
((draws her left hand closer to her body, closing her fist))
and slides it
((opens hand and moves it in an upward trajectory roughly parallel to her body))



1.4 through the
((completes her trajectory at head level, palm outward))



1.5 (.) um (.) through the closet an:d
((moves left hand back toward her body))

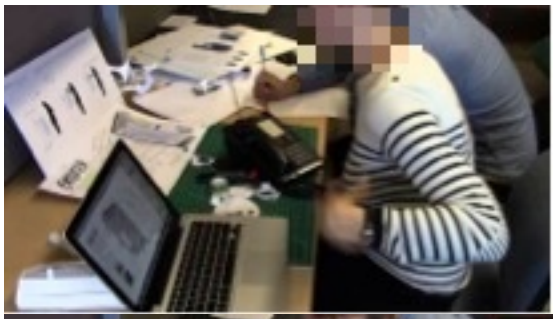


1.6 out
((moves open hand upward as before, palm facing outward))
at the top

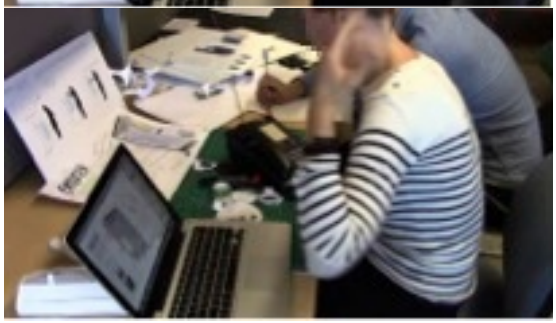
In this part of her presentation, Mylie is performing her design in a way that it appears before and independent of her. She is in fact taking up a position with respect to her design that is typical for the hard sciences and the relation of scientists to their object: it is a *third-person stance.* In this stance, the object exists separate from the person creating it. This stance goes beyond the page, entering into the 3-dimensional world. It concerns what can be seen in front and at a distance, impersonally, as anyone might see while looking at a design. Vision is the primary sense invoked, often with verbal reference to properties of size, shape, material, or physical forces and constraints. Gesturally, (as we see in the next case) participants point at the three-dimensional foam models on the table in front of them, or handle the artifacts while making verbal reference to them. Third-person is also gesturally identified as the "observer" viewpoint: when "the hand(s) represent one or more of the entities in the narration" (McNeill, 2005, p. 34), such as Mylie's use of her hand to represent the air.

Mylie continues with her description, and in so doing changes once again her positioning with respect to her design and its interaction with the world.

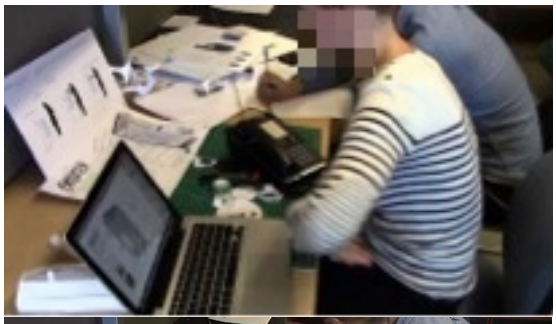
1.7 (.) so that the clothes
((moves left hand in toward her body, palm inward, in a circular motion))
would get



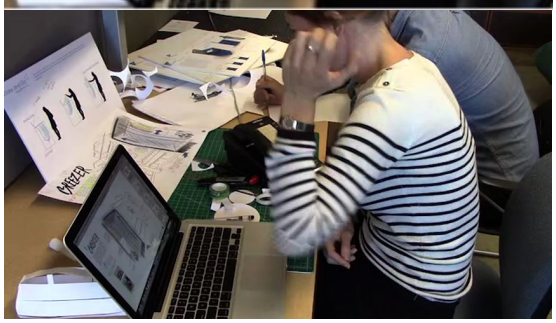
1.8 a strong airflow
((hand moves rapidly up alongside her torso))



1.9 and (.) uh (.)
((hand moves rapidly down alongside her torso))



1.10 ((hand moves rapidly up))
help them kind of
((repeats the downward/upward movement of her hand))
breeze out



In the fragment illustrated in 1.7-1.10, Mylie's left hand moves toward her body, outside of or at the far left periphery of her field of view. In its up and down motion, the hand continues to represent the "strong airflow" within the Breezer. In the movement visible from turn 1.7 to turn 1.8, the left hand/arm combination stays close to the body. The hand/arm then quickly move downward (turn 1.9), thereby setting themselves up for showing the movement of the air through and out of the Breezer (turn 1.10). This final movement quickly repeats itself.

In contrast to the previous fragment (1.3-1.6), Mylie's movement of her hand close to her body draws her body into the participation framework, bringing her into a new relationship with her design. Through her body positioning relative to the breeze that her hand represents, her clothed torso acts as the clothing that is to hang in the Breezer. At the same time, her head and body enact the role of a human user *who wears clothing* (i.e. the clothing that she herself wears and that she references in her hand movement alongside this clothing) to hang in the Breezer. This *first-person stance* is distinguished from third-person by where the participant locates himself or herself with respect to the borders of the staging area in which the performance takes place. There are two fundamental locations for purposes of categorization: inside or not inside. In first-person (or what McNeill (2005) calls "character") stance, "the speaker him/herself is inside the gesture space" (McNeill, 2005, p. 34). By contrast, in third-person stance the participant locates himself or herself on the border or outside the frame in which the performance is staged. Touch or "feel" is the primary sense that is verbally invoked to signal first-person stance. Participants signal their insideness with the orientation and placement of their entire body relative to their hands and the larger participation framework, taking on the role of a person who is using the envisioned artifact, or animating some part of the designed artifact.

Mylie, however, is not simply in first-person stance, for while her body is now inside the frame, her hand continues to enact the breeze as it had in third-person. In some senses, in the totality of her gestures with respect to her body and her coordinated speech, she combines third- and first-person stances to become the whole system, the whole phenomenon in which she is trying to design: Breezer, air, clothes, person, all in a windy flux. She is no longer looking in from outside the frame, but is now inside, inhabiting the phenomenon even as she brings it into being. And her

words “breeze out” reinforce this totality in turning “breeze” into a verb while at the same time combining this verb with “out” makes a pun: The breezer breathes the clothing contained within. In appropriating her own clothed self in her enacted display, she references both clothing and wearer at the same time. And in so doing, she connects to the very reason for this Breezer design: people “breathe in” the scents of the world into their clothes—in the perfumes they wear, the sweat they secrete, the earthy landscapes they traverse, the curried kitchens they socialize in—which they can now “breeze out” in Mylie’s designed compartment. In her coordinated speech and gesture, there is no longer a distinction between the person and the design. She becomes the breath and wind that Ingold (2011, p. 139) speaks of: “[T]o live we must be able to breathe. Wind and breath are intimately related in the continuous movement of inhalation and exhalation that is fundamental to life and being.” In inhalation, wind becomes breath; in exhalation, breath becomes wind. As a result, “the wind is not so much embodied as the body *enwinded.*” In this stance, combining first- and third-person, the designer becomes the entire design phenomenon: object, person, and context, so we call it the *phenomenal stance*. This is generally done when the hands animate some part of the design in use indicating third-person stance while the torso and/or head animate a person using the design.

From the start of Mylie’s first gesture (1.2) enacted above the inscription until her final gesture alongside her body (1.10), 14 seconds elapse. During this time, she traverses sequentially through three distinct design stances, three ways of positioning and being positioned with respect to design and the lived-in world: first, oriented toward the abstract inscription, then lifting off the page into an objectivized third-person view, and finally becoming the entire design phenomenon. Designing and presenting design are not characterized by a single stance; instead, the design is alive in the fluidity of the design performance through the different design stances, each adapted to manifesting a different aspect of and perspective on the design.

1.3. Interaction of Stances in the Participation Framework

When designers and design critics engage each other, the design stances come to interact. In fact, understanding one another appears to presuppose taking the same stance to understand the other. As participants move through stances, thereby being and taking-up positions in the world of the emerging design, their stances need to adjust to each other if mutual understanding is to exist. In the following case, we exhibit the interaction of stances when two participants, a critic (Darren) and an undergraduate student (Addison), mirror and build on one another’s stances.

The presence of the 3D model facilitates Darren’s bringing it to hand in initiating the discussion and immediately moving into third person stance.

```
2.1  Darren:   this guy
                 ((reaches to a model on the
                 table))
```

2.2 ((lifts a model from the table with his right hand and places it on his left hand))
you know the first (.) the first (.)

2.3 a lot of your images (.)
((points index finger of right hand to one of the boards that holds images related to the design concept that Darren holds))

2.4 Addison: ((gazes momentarily in the direction of the concept board at which Darren points))

2.5 Darren: almost come off (.) like there is a wire (.)
((moves right hand upward in a spiral motion, index finger extended))




In 2.1, Darren starts the discussion by taking a model from the table and, in holding it, makes explicit indexical reference to it ("this guy"). The speech and the holding are intelligible only with respect to one another. As a 3D model, the model is not only viewable by each of the critics and Addison, but can be and is picked up and manipulated as an object, in the third-person.

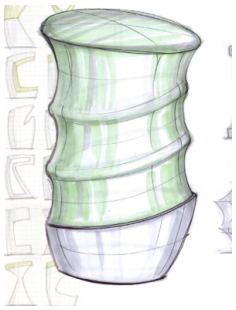


Figure 4

In 2.2, Darren augments his third-person stance with the inscriptional stance, pointing to the concept board with the images of the stool that stands on the desk between himself and Addison (see Figure 4). In taking the inscriptional stance, he continues to hold the third-person stance, thereby cross-referencing and relating to different representations, from "this guy," the 3D model, to "a lot of your images" on the concept board.

Not only is Darren's stance made publicly visible through his gestures and gaze, the other participants shift their gaze and orientation to align with Darren's stance. As Darren picks up and holds the foam model in 2.1 and 2.2, the other participants orient toward that model. As Darren points toward the concept board, the participants orient toward that concept board. Darren thus adopts a sequence of stances that the other participants mirror in their own stances.

In 2.5, Darren moves back into the third-person stance. After stating that "a lot of your images almost come off like there is a wire," he stops speaking entirely, and uses the upward spiral movement of his hand in the visual space in front of him as a speech turn, gazing at his hand as he gestures. In making this movement, he captures with his gesture not the experience of sitting on the stool, but one of the stool's essential features, using his hand motion iconically to mirror the structural feature of the spiral apparent in several of the drawings.

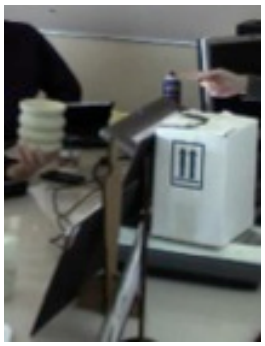
```
2.6  Addison:  structure
2.7  Darren:   structure that expands like
                 ((brings right hand to the level of his head,
                 rotates hand about wrist)
               that (.)
                 ((makes wave-like motion where his hand opens
                 and closes))
               that
                 ((opens and closes hand again as he moves it
                 lower))
               flexible lycra-type material or something were
               you were you ↑thinking about that ori
2.8  Addison:  um
2.9  Darren:   originally or
```

In 2.6, Addison completes Darren's sentence fragment ("a lot of your images almost come off like there is a wire") with the word "structure," thereby reflecting back to Darren this visual characteristic of the design, which Darren repeats in confirmation of her interpretation. In 2.7, Darren continues with his third-person, gestural movements, using his hand metaphorically in wave-like openings and closings as he talks about a "structure that expands like … flexible lycra-type material."

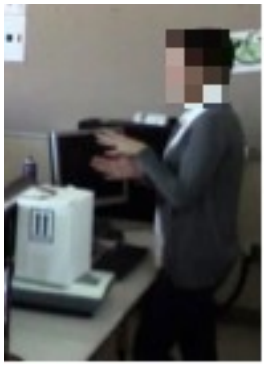
To summarize 2.1-2.9, his overall movement through these stances starts in the third-person in picking up the foam model and making indexical spoken reference to it, moving to the inscriptional with both a gestural deictic and spoken indexical, completing his utterance with a metaphorical gesture that expresses the third-person material and figural qualities of the design concept. Other than a moment in the inscriptional stance to ground his discussion in an earlier conception of the design model that he holds, Darren begins and ends in the third-person stance, placing the design model in center stage.

In 2.10 Addison's response begins in the third-person stance with a deictic gesture directed to the model that Darren holds.

2.10 Addison: more for
((extends her right arm and hand, index finger pointing to the foam model that Darren continues to hold))
that one
((draws extended hand back toward her body))
I wanted especially
((orients several degrees to her left, re-extends her right arm and points thrice more in quick succession to the foam model that Darren holds while gazing toward the models on her left))
that one I wanted there
((draws right arm closer to her body, covers left palm over right))
to be (.)
((opens hands apart))
enough GIVE
((brings hands together as she says GIVE))



2.11 that when
((moves hands together and apart twice as she speaks))
you do sit on it (.) you



2.12 ((moves right hand to the side at the same time as she pushes her left palm downward and also bends her knees as if she is starting a sitting motion))
kind of
((moves her left palm up and then down as she straightens her legs and then slightly bends her knees again))

feel the difference but (.)
((straightens her legs))
because the piece
((waves left hand toward
foam model))
looks like thats what it would
do
((brings hands together
close to her body at sternum
level))

She then discusses a behavioral characteristic that the envisioned stool would have when someone sits on it ("enough GIVE"), emphasizing the word "give" by increasing her speech intensity from 64dB on the prior word to 88dB. As she says this word, she moves her hands closer and farther apart, enacting the springiness, the "give" of the stool. That her hands are in front of her and visible to her suggests a third-person perspective. In 2.11 she speaks about the "feel" of the stool when someone sits on it. In going from talking about the stool's springiness to the felt experience of a person sitting on it, she changes stance from the third- to the first-person, and at the same time uses her entire body to pantomime a sitting motion, going down and up twice to show the feeling of compression and decompression that the "give" imparts.

As with Mylie, Addison does not simply inhabit a first-person stance. While making the sitting movements with her legs, Addison's left-hand enacts the third-person perspective by pushing down to represent the stool's "give" when sat upon. Hands and body, then, represent first- and third-person perspectives together, the entire phenomenon of person-using-stool. Addison configures and is configured by the phenomenal stance.

As the discussion continues, Darren inquires into Addison's thought process.

2.13 Darren: ((orients to the foam models on the table))
(.) ah just (.)
((extends right hand palm open in direction of
foam models))
you've got
2.14 Glen: ((oriented to the projected image on the
screen at the front of the room, extends right
arm, index finger pointed))
why don't you go back to that slide=
2.15 Addison: ((looks at keyboard and presses key))
2.16 Darren: well youve got a very different
((orients to projected slide))
youve got a very <<len> different) (.) uh (.)
progression from what>
((extends left hand, index finger pointing to
slide))
we see in the top to the bottom (.) I think
theyre both valid its just (.) ah (.) you know I
guess my question was (.) was that part of your

		thought process or cause I mean both forms are really nice ((grasps one of the forms on the table with right hand))
2.17	Addison:	on this one? ((points to the same form that Darren is grasping))
2.18	Darren:	yeah
2.19	Addison:	um originally (.) uh (.) when I modeled the (.) the ((extends right hand, finger pointing to the image on her computer monitor to what appears to be the top sketch)) original sketch with this one (.) and I had it to the the dimensions that we were given (.) it looked (.) awkward and it it didnt look comfortable I (.) its not something I wouldve sat on and so I took the: (.) the (.) metal part off the bottom and tried to (?) play with that a little bit more

In 2.13, Darren uses his hand deictically to refer to one of the models. Glen, the teacher sitting at Darren's left, who has so far been silent, proposes that Addison project the image associated with the model that Darren has pointed to. At this point, Darren orients to this inscription, and uses the spatial arrangement of images to ask a contrastive question about the different design conceptions that the images represent ("we see in the top to the bottom"). The "top" conception is what is illustrated in Figure 4, which includes the spiral, wire shape that Darren had earlier pantomimed. The "bottom" conception is in Figure 5, without the spiral, which is modeled in foam that Darren had been holding. Before answering Darren's question, Addison checks that she and Darren are discussing the same design (2.17), which Darren confirms (2.18).

Addison then provides an account of her designing process (turn 2.19). She first identifies the top sketch as the "original," thereby establishing a temporal sequence in the inscription from the top (original) to the bottom (current) image. What Addison elaborates as well is that this is not a simple move from before to after that occurred wholly and completely in the inscriptional space. Rather, there were hidden steps that came off the page that occurred between the images in the inscription. Addison modeled the top image in foam ("when I modeled the … original sketch"), moving off the page into three dimensions. Doing so gave Addison new insights into characteristics of the design not revealed in the inscription: "it looked awkward." In addition, she imagined herself experiencing the design as a user, sitting on it, and "it didn't look comfortable." As a result, she removes the bottom metal piece, "played with" the design and in so doing also removed the spiral, resulting in the bottom drawing. Addison thus narrates her sequence of movements through design stances, though one that likely took place over hours or days for Addison, from drawing (inscriptional) to foam modeling (third-person) to imaginatively experiencing (first-person).

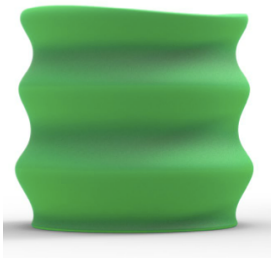


Figure 5

In summary, as the interaction unfolds, the back-and-forth between Addison and Darren represents more than the simple turn-taking of mundane conversation (Sacks, Schegloff, & Jefferson, 1974). These designers are, in addition, taking on particular stances in relation to the design, displaying the stances for one another, and mirroring these stances as part of the ongoing performance of the design. Darren invokes the third-person stance in holding one of the foam models. He verbally switches to the inscriptional stance with verbal reference ("a lot of your images") and a deictic to one of the concept boards. Addison adopts this same stance in quickly gazing at the inscription that Darren points to. Darren continues narrating while holding the foam model, moving back to the third-person stance in enacting the spiral motion, emphasized in cessation of speech. This gesture appears in the staging area between Addison and the circle of design critics around the table, visible by all, though from slightly different perspectives. He continues in the third-person stance, describing visual properties that are at the same time gestured. Addison responds to Darren in the same third-person stance, pointing to the same model that he continues to hold. Stances are thus configurings of people in relation to artifacts that are reflected in other participants in a design conversation.

In our initial analysis of these critiques, we had conjectured that the movement from one stance to another was from the inscriptional to the third-person, to the first-person or phenomenal, always in this same order. But this interaction between Addison and Darren reveals a fluid movement from one stance to another, not only reflecting a designer's "conversation" with the materials of design (Schön, 1983), but in the responses that designers make to the stances of others. In addition, this case illustrates that it is not only the initial designer who takes on stances toward his or her design, but any of the other participants can also do so. We also had conjectured that each participant inhabited a single stance at a time, but our analysis showed times when a participant inhabited multiple stances simultaneously.

Finally, while different designers can invoke different stances to experience and communicate different aspects of a design, particular representational forms appear to *evoke* particular stances by a designer. For example, Darren does not simply start talking about one of the design concepts as an abstraction. Rather, he responds to the foam model on the table in front of him, and in picking it up enters a third-person stance. Addison, in discussing her modeling of a sketch, orients and points to the sketch that she refers to. These representational forms are not simply inert objects in the environment, but living resources in the world. They become part of the histories of the designers as they move through a design trajectory, and serve to ground particular stances as well as the communication that revolves around them.

1.4. Stance Fixation and Communicative Troubles

In the above cases, as student designers relate to their designs—Mylie and the Breezer, Addison and the springy stool—the designers go beyond individual stances to imagine the lived experience, before the finished artifact exists. Both use their bodies and words to represent multiple perspectives at once, capturing the essence of the entire design phenomenon that they communicate. Communication with the design critics is enabled when the participants follow and build on each other's stance.

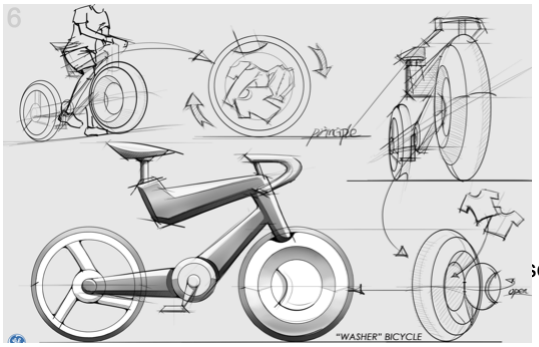


Figure 6: Walter's bicycle-driven washing machine

By contrast, if one or more of the participants in a design critique remains fixed with respect to the stances taken, unable or unwilling to take on the

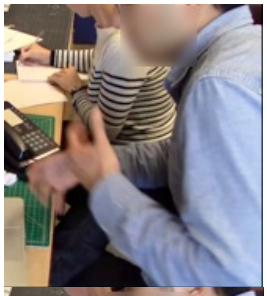
stances of others, we may anticipate communicative trouble to occur. This is so because taking a stance is equivalent to a particular way of being-in-the-world. If design critique participants do not follow each other in their stances, then they literally inhabit different worlds allowing misunderstanding or non-understanding to arise.

An example of this situation can be seen in the following case, which shows a graduate student designer (Walter) who maintains a predominantly inscriptional and third-person stance throughout his design performance. The critics invite him to enter the first-person stance or the phenomenal stance, but Walter does not follow. He does not appear to hear the expert's critique or take-up the expert's suggestion for improvement. We focus on Walter's presentation of one of his design concepts, a bicycle-driven washing machine (Figure 6), which is his concept number 6 (upper left corner of Figure 6).

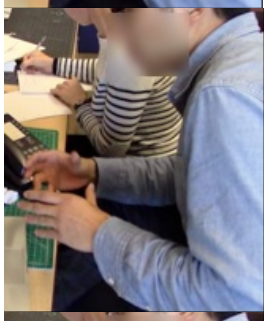
In 3.1-3.6, Walter describes this concept to the remote critics, who remain silent during this fragment. Walter orients toward his laptop display, which shows an image of his bicycle-driven washing machine. This image also appears on the display of the critics.

3.1 number 6 I (.) the idea of this one is a washer bicycle (.) and you can see an uh for this bicycle the front wheel is uh kind of the space for washing your clotheses (.) and uh its not uh electric or electronic design

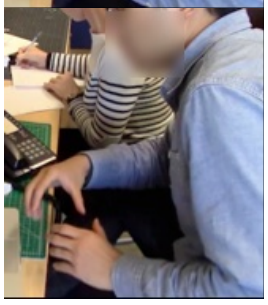
3.2 it's just a
((moves hands in front of body palms inward, rotates hands around one another))
kind of a space you can you can



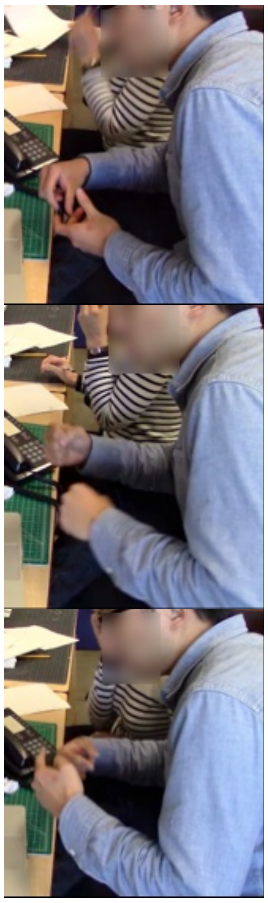
3.3 put
((moves cupped hands together and downward))
your (.)



3.4 clothes
((cups right hand together as it raises slightly, rotates cupped right hand so that fingers and thumb point downward toward the cupped left hand, and opens right hand as it moves downward toward the space defined by the left hand as both hands and arms move downward))
in the in the in the front wheel (.)
((repeats previous gesture))



3.5 and put the detergent and the water in the front wheel (.)
((repeatedly brings right thumb and index finger together and moves them down into the space defined by the left hand))



3.6 and when
((brings hands up, closes fists, and then rotates his hands around one another))
you when you ride the bicycle (.)

3.7 the front wheel
((opens grip, extends index fingers of both hands, continues to rotate hands about one another))
is rolling and a rolling front wheel can help you to wash the (.) can help you to wash the clotheses inside
((drops hands to table, resting on index finger of each hand))

In 3.1, Walter begins describing his bicycle-driven washing machine. In the latter part of 3.1, Walter describes the front wheel as a "space for washing your clotheses [sic]" and in 3.2 uses his hand to make iconic gestures that convey the rotational aspect of the bicycle wheel. In 3.3, he moves his cupped hands together and slightly downward, suggesting a contained space. This gesture is repeated twice, once each for the beat of "put" and "your". In 3.4, he keeps his left hand in this container shape while his right hand moves downward toward this contained space as he says "in the in the." Starting with his right hand with palm open toward the left (3.5), he slightly closes the fingers of the right hand as if holding something, moving it toward the cupped left hand as he says "and put the detergent," repeating this movement as he says "and the water." In 3.6 he again rotates his hands, this time with each hand clenched together, while speaking "when you ride the bicycle." He continues to rotate his hands in 3.7, this time with index fingers extended as he verbalizes "rolling."

In orienting to the inscription in on the computer display and stating "you can see" (3.1) Walter takes on the inscriptional stance. Throughout 3.2-3.6, Walter uses his hand to make iconic gestures that convey the dynamic characteristics of the bicycle that are represented diagrammatically only as arrows. In doing so, he has moved off the page, into a third-person stance. Walter's iconic use of gesture for representing the movement of objects through time mirrors a similar use of gesture by architects to illustrate dynamic characteristics of objects in their design drawings that are difficult if not impossible to represent in 2-space (Murphy, 2005).

There is one point at which Walter might momentarily move into the phenomenal stance. In 3.4 and 3.5, Walter describes putting clothes, detergent, and water into the bicycle's front wheel. At the same time, the left hand creates a container-like space toward which the right hand moves. What is difficult to discern is if the right hand enacts the kind of putting that a human user would do when using this washing machine, or if Walter uses a prototypical metaphorical gesture (McNeill, 1992), to represent a generic "putting" action.

Similarly, there is ambiguity as to whether Walter briefly enters the phenomenal stance in 3.6 in grasping his hands together while saying "you ride the bicycle." This is the hand shape that a human rider might take in riding, and it is distinct from the hand shapes that Walter uses just before in describing "putting" and after in describing "rolling." But it is also the case that this hand shape and hand orientation would not work for the bicycle that he has drawn and that he is looking at, nor does he involve any of the rest of his body in the bicycling effort (e.g. rounding his back and shoulders, extending his neck). Regardless, in both of these cases, if he does enter the phenomenal stance, it is only momentary, and these are the only times in his 14 minute critique at which he possibly takes on a first-person or phenomenal stance.

Several minutes later, after Walter has presented all of his design concepts, he solicits feedback from the critics. Peter, the expert critic, and Walter have the following exchange concerning Walter's bicycle washing machine.

3.8	Peter:	if you go to number (.) 6
3.9	Walter:	number 6 ((uses touchpad to display the bicycle design concept on the computer monitor, which also displays it on the remote computer that the critics are using))
3.10	Peter:	I I think there is something here: er th the physics of it would never work (.) uh as far as balance
3.11	Walter:	um hm
3.12	Peter:	it its (.) or it would be incredibly difficult (.) but if this was more of a stationary thing
3.13	Walter:	uh huh
3.14	Peter:	I think theres something there
3.15	Walter:	okay okay
3.16	Peter:	more of a stationary bike
3.17	Chuck:	and I got to tell you Peter would know:
3.18	Peter:	Yeh ((laughs)) Ive worked in bikes for a long time so (.) uh (.) its its (.) it would be <<len> very heavy and very tricky>
3.19	Walter:	okay=
3.20	Peter:	although I love the thinking
3.21	Walter:	(.) okay
3.22	Peter:	but I think if you did something like this that was more in a stationary kind of work out

```
                th[i:ng]
3.23   Walter:  [but] I mean but I mean if I move the dryer or
                washer into the: into the <<all pp> I mean the>
                REAR wheel
                   ((Walter raises his right hand to chest level
                   and moves it from right to left))
                it will be BETter do you think so
3.24   Peter:   (.) uh:::
                  ((exhales audibly))
                (.) Iee: (.) this one just seems (.) so far
                fetched
3.25   Walter:  okay okay (.) makes sense (. . .) so (…)
3.26   Peter:   if it were me thats what I would do (.)
                   ((Walter begins to use his fingers on the
                   trackpad to move the computer cursor across
                   the diagram))
                so you keep all your cool styling you just kinda
                make it (.) more (.) of a stationary thing
3.27   Walter:  okay
```

In 3.8, Peter references the number on one of Walter's concept drawings, which Walter repeats and then brings onto the shared computer display. Peter then makes an assessment with a mildly positive valence ("I think there is something here") in 3.10, followed by a negative critique in the latter part of this statement ("the physics of it would never work") and elaborated in 3.12 ("it would be incredibly difficult"). In 3.14 Peter repeats his positive remark from 3.10. As Murphy et al. (2012) point out, although negative assessments are, in the everyday world, disruptive of the social order, they are normal feature of design critiques. But when making these negative assessments, critics provide an account for them, both to mitigate the effect of this "bad news" on the student, and to make salient some aspect of the design that the student has taken for granted.

In 3.11-3.21, Walter responds minimally ("um hm," "okay") with what are often referred to as *response tokens* (Gardner, 2001) or *acknowledgement tokens* (Beach, 1995), serving to signal that the speaker has been heard while preserving the speaker's turn at talk (Sacks et al., 1974). In 3.12, 3.14, and 3.16, Peter suggests an alteration to Walter's design by making it stationary, this way avoiding the problems of balance while still preserving "the thinking" from the original design that Walter presented. Walter continues with his minimal response tokens, not yet signaling that he has taken up Peter's suggestion or understands the basis of Peter's concerns. In 3.17 Chuck underscores the authority of Peter's comments ("and I got to tell you Peter would know"), affirmed in 3.18 by Peter who indicates that he has considerable experience in designing bicycles. Peter reiterates the physical challenges of using the design, that "it would be very heavy and very tricky" In 3.23, Walter explicitly signals that he is not (yet) willing to accept Peter's critique, to accord it legitimacy. Rather than accepting either Peter's critique or his design fix, Walter counter-offers with the suggestion that he move the washer into the rear wheel rather than the front as he currently has it. In doing this Walter explicitly signals that he is not (yet) willing to accept Peter's critique, to accord it legitimacy.

3.24 shows considerable hesitation on Peter's part at the start of his response, which is typical of non-acceptance of offers and disagreements (Heritage, 1984; Pomerantz, 1984). That is, this hesitation serves as a harbinger of the non-acceptance that will follow, and in this way softens it. Given Peter's repeated attempts in 3.7-3.21 to convince Walter that his design won't work in the physical world because of the difficulties for the human user, in 3.24 Peter makes his strongest statement yet about Walter's design in 3.24: it is "so far fetched," which applies regardless of whether the front or rear wheel is used for the washer. It is only at this point that Walter signals some amount of explicit agreement, in that Peter's comments "make sense" (3.25). In 3.26, Peter responds to Walter's offer of acceptance by conceding that Walter can keep what Peter takes to be Walter's cardinal value, the "cool styling" as long as Walter trades the violation of physics and makes the bicycle stationary. In focusing on the "cool styling," Peter acknowledges Walter's orientation to the inscription and the visual properties of a third-person perspective, while at the same time attempting to attune Walter to the first-person experience of the person who would ride the bicycle.

In this entire episode (3.1-3.27), we observe the trouble that arises in design communication when there is misalignment in the stances taken on by different participants. The first portions of this episode seem unproblematic. In 3.1, Walter and Peter begin together in the inscriptional space, using it as a shared medium through which to ground their reference. Walter remains in this stance, oriented to the inscription while explaining different functional characteristics ("put your clothes in the front wheel"). In 3.2, Walter moves into the third-person stance as his hands enact the spinning of the wheel in the visual space in front of him. Throughout the rest of this dialog, Walter never appears to engage the rest of his body, other than hands and arms, nor does he describe or enact the "feel" of the design. Only momentarily might his body proper enter into the performance of the object that he describes.

In talking about "the physics of it" in the first part of 3.10, Peter comes off the page, not only into a 3-dimensional world, but into *this* physical world with all of its properties. Because of these properties "it would never work." This is not simply a drawing on a page, but stands for a physical artifact subject to the constraints and affordances of the physical world. This critique mirrors that which Oak (2000, p. 91) has previously identified, trenchantly captured in the comment of one of the instructors in a critique that Oak recorded: "It's a nice idea but it's not actually real."

Where Walter and Peter begin to diverge is in the latter part of 3.10 when Peter suggests a first-person stance in describing qualities that he implies to be problems for a person using this bicycle. These are problems of "balance" that would "never work", that the bicycle "would be incredibly difficult" and "very heavy and very tricky," this last phrase emphasized through the slow and deliberate way in which Peter speaks it. Walter does not respond to Peter's first-person stance by mirroring it, but rather only minimally displays his understanding of the critique with his response tokens. And when he finally makes a longer response, he does so from an inscriptional stance, remaining oriented to the page in suggesting moving the washer from the front to the back wheel. Peter, in what appears to be frustration, makes a strong critique about the unworkability of this design, that it is "so far fetched" regardless of whether the washer is in the front or back. Peter and Walter are thus misaligned, operating from different stances throughout most of this episode. Only at the end does Walter state that Peter's critique "makes sense," to which Peter responds by acknowledging Walter's inscriptional orientation and focus on visual

properties ("cool styling"), but that these can only be preserved if the first-person concerns of difficulty of use are addressed.

3. The dialectic of the social and the individual

In this study, we investigate the different stances designers and design critics take. We exemplify four stances that we identified in the design critiques between student and expert from the DTRS 10 dataset: the inscriptional, first-person, third-person, and phenomenal stance. In the cases of Mylie and Addison, both designers flexibly move through the different stances while presenting and submitting designs for critique. During these critiques, we observe the participants taking similar stances to each other, adopting and following each other in taking their stances. When this does not occur, when one of the participants does not follow others in taking a design stance, miscommunication is likely to occur, as seen in the case of Walter.

Normative requirements for communication during design critiques, e.g. that the student present his or her design mediated by inscriptions or models that critics respond, provide a natural setting for participants to make visible their own stances in relation to the design under discussion. Participants in design critiques not only tell about designs, but bodily display for one another different ways in which a designer can position himself or herself in relation to a design. We suggest, in addition, that designers inhabit these stances not only during these social encounters, but during all design activity, whether alone or with others. That is, following Vygotsky (1978), we conjecture a movement from the social sphere of design activities such as design critiques, where such stances are publicly displayed and socially produced, to the individual, who internalizes and appropriates these stances for his or her own design activity. These stances then serve as internal resources that can be externalized during further social encounters so that there is an iterative and ongoing dialectic between the individualization and social reproduction of these stances.

The presence of the social in formal educational settings such as the one in which the analyzed critiques were situated, extends beyond the design critique. For example, the forms of instruction, such as the presentations, discussions, descriptions, design problems, and so on that constitute the instructional materials and design, include socio-historically sedimented representations that students are required to use for making design activity manifest. In the cases examined here, these representational forms include 2D sketches captured in concept boards and 3D foam models. In requiring these particular representational forms, the instructor helps the student designer to take on the inscriptional and the third-person design stances. At the same time, the predominance of these forms, and their use at particular points in the design cycle, imply a privileged status for the inscriptional and third-person stances over the others identified. In addition, the use of these forms and their corresponding stances implies a tacit understanding and therefore a tacit pedagogy for how a designer uses these forms and stances for moving along a design trajectory: first inscriptional, then a low-fidelity form (such as foam models for industrial design), then higher-fidelity mockups, through to a final design. This trajectory can be seen in many treatises on design. For example, Nelson and Stolterman (2003, p. 33) comment "Design is a process of moving from the … general and universal to the *ultimate particular*—the specific design." Similarly Dym and Little provide a prescriptive model for design that moves from conceptual design to preliminary design to detailed design to final design (Dym & Little, 2004). And Buxton (2007) describes the design process as a "funnel," in which low-cost, quickly drawn, ambiguous drawings dominate the early part of the process (the wide mouth of the

funnel), and increasingly high-fidelity prototypes dominate the latter parts of the process, as the funnel narrows to a point.

Despite their many virtues, what sketches, foam models, and other low-fidelity representational forms often do not capture, however, is the *experiencing self* in direct contact with the envisioned design required in the first-person and phenomenal stances. Consider, for example, the brief of "impromptu seating" that the undergraduate students were given. During their critiques, each of the seven students presented multiple images of products that currently exist on the market, often making verbal reference to the visual sensory mode, as in "when I looked at … what you guys are all about some of the products you have and then I took a look at the competition" (Albert) and "I looked for some products that were made by the competitors" (Lana). What none of the students report is any experience that they themselves had, either in the past or as an explicit aspect of carrying out their current design activity, of *sitting* on different kinds of furniture. How will they know how different heights, materials, shapes, and sizes affect the experience and afford or hinder the activities one might do while sitting, such as writing, dozing, reading, talking or working if they do not take these experiential stances? This is not to suggest that visual forms are inherently unsuited to evoke the first-person or phenomenal experience associated with particular designs. For example, in one of the design critiques from the data sources analyzed, in commenting on one of the student designs projected on the screen at the front of the room, one of the expert critics moves from inscriptional, to third-person, to phenomenal stance within a span of 5 seconds. Particular design representations, however, such as the sketch and the 3D model, appear to predispose a designer to particular stances (inscriptional, third-person).

This first-person bodily experience of design is what Cross (2006) reports as an important feature of the design education introduced by Johannes Itten, a member of the Bauhaus. "Itten himself incorporated physical exercises into his courses, and required his students, for example, to swing their arms and bodies in circular movements before attempting to draw freehand circles. He and other tutors also encouraged tactile perception and the construction of collages from randomly-collected junk and other materials" (2006, p. 24). And such experience-centered design is advocated by Buchenau and Suri (2000), who propose that designers themselves carry out *experience prototyping*. "By the term 'Experience Prototype' we mean to emphasize the experiential aspect of whatever representations are needed to successfully (re)live or convey an experience with a product, space or system" (p. 424). Rather than being a characteristic of expertise, as we had originally thought when early in our analysis, adopting the first-person or phenomenal stance is likely to be a result of the educational and social milieu to which a designer belongs. We believe that it can be taught or evoked, as Itten, Buchenau and Suri suggest.

Fila and Hess (2014) suggest that the experiencing self is an important resource that designers use in developing *empathy* for the people for whom they design. In their analysis of the data from DTRS 10 (Adams & Siddiqui, 2013), they draw from Batson's (2009) enumeration of eight different senses of this term, which include "(b) Adopting the posture or matching the neural responses of an observed other, (c) Coming to feel as another person feels, (d) Intuiting or projecting oneself into another's situation." Empathy is not simply affective, but embodied as well, so that the designer positions herself to mirror another, just as Addison positions herself on the stool that she is designing in order to feel its "give." She thus uses a first-person stance as a means for developing a "feel" for an anticipated user's experience of the stool. And Addison and

Darren mirror one another's stances in the back-and-forth of their design conversation, just as Walter and Peter fail to do so.

The phenomenal stance extends beyond the first-person. For in this stance, the designer not only takes on the first-person stance, he or she does so without relinquishing the third-person stance; both occur at the same time. For Merleau-Ponty (2000), this hybrid stance is a basic condition of human life: "man is simultaneously subject and object, first person and third person, absolutely free and yet dependent." When Addison uses her hand to demonstrate the "give," the spring-like qualities of her stool design, she positions herself behind the stool, representing the stool *qua* object in front of her, something that is "present-at-hand," (Heidegger, 1962) with particular material properties when in use. Her hands represent the stool, the object, the thing. When, at the same time, she also uses her legs and torso to pantomime a sitting motion, she enacts the stool *qua* stool, something that is "ready-to-hand," a useful object that people unreflectively sit-upon in their coping in the world, "something-in-order-to" (Heidegger, 1962). In this hybrid stance, Addison straddles the conceptual frame, both inside and outside this frame at the same time. She has, in that moment, become the entire design phenomenon that she is designing: not simply "sitting" or "a stool," but this-stool-being-sat-upon. And in inhabiting this stance, she positions herself *as* a designer. In taking on the phenomenal stance, a student configures the design and at the same time is herself configured "Being a student is generally best described neither as finding innate abilities in oneself nor as acquiring a mass of facts about the world. Instead, being a student on Heidegger's account is learning how to go about in the world a certain way, for instance, as a physicist or as a Peterosopher, where who one is and what one does are inseparable" (Hoy, 2006, p. 184). . Becoming a designer is not so much an "acquisition of expert knowledge" as a form of being that reflexively changes the person as it changes the world.

4. Conclusion

The purpose of this paper is to investigate the stances that designers take during design activity. As a site in which designs are communicated, we analyze design critiques due to the normative obligation for participants to make their design conceptions publicly available to one another. We view the participants of the critique as creating a frame for participation with the physical placement of their bodies in space, their orientation, their speech, and their gaze. The participation framework becomes a stage on which a scene depicting the envisioned design is enacted. Attending to and identifying the shifting stances exhibited by the different participants, we show that design objects are not so much shared, presented or discussed as they are *performed* (Fleming, 1998) within the staging area created by the participation framework. Critiques are interactively produced not only with speech, but through the multi-modal use of a variety of semiotic resources, including gesture, body positioning, and elements from the environment, such as inscriptions and models of design concepts.

Design stances are made publicly available and signaled not only by the spoken expression of different viewpoints, but in accompanying body gesturing and orientation. We identify four distinct stances that designers display, which we label *inscriptional, third-person, first-person,* and *phenomenal.* These stances represent relations that designers establish between themselves and the objects that they envision as they "imagine that-which-does-not-yet-exist, to make it appear in concrete form as a new, purposeful addition to the real world" (Nelson & Stolterman, 2003). In the inscriptional stance, the designer orients, points to, or verbally references a sketch, concept board, or display on a monitor or projection screen. In the third-person stance, the designer moves off the page and into a 3-dimensional world, locating the design as a visual

object in the space in front of him or her, visible to her and others in the participation framework. Foam models are grasped and pointed to, visual properties are verbally described, the hands perform iconic gestures in the space in front of the body. In first-person stance, the designer describes the tactile and proprioceptive characteristics of a design, or moves inside the participation framework, incorporating his or her own body proper or head in iconic gestures mirroring the actions of a human user or animating "from the inside" some aspect of the designed object. And in the phenomenal stance, the designer inhabits both the third-person and first-person perspectives at the same time, and in so doing communicates the entirety of the design phenomenon: object, person, and context. What makes these different stances possible and communicable to others is the designer's material body. In physical stance, orientation, gesture, speech, and gaze, a designer positions himself or herself in relation to the conceptual space of the object under design, shifting from one stance to another throughout a design performance.

Although identified in the social sphere, we suggest that these stances represent positions that designers take in all of their design activity. Further, we conjecture that these stances are evoked by the representational forms that designers use to manifest their design ideas, as well as the embodied activities that they undertake while designing. In representationally-mediated design conversations, such as critiques, designers display and reproduce these stances for one another, which become resources for internalization and subsequent externalization.

Schön (1985, p. 26) uses a verbal, dialogic metaphor to describe the relationship between the designer and the objects of design. "[W]e can think of the inquirer moving in the situation and the situation *'talking back'* to the inquirer ... The entire process then has the quality of a *reflective 'conversation with the situation'*. [emphasis in original]*."* We intentionally use a different metaphor for this interaction, that of *stance*, of one's body positioning with respect to a larger space in which design is imagined and staged. As we have seen, designers, particularly those who inhabit the first-person and phenomenal stances, are not so much "talking" with a design situation as they are entwined with it. The design and the designer are co-constituted in the activity: the design cannot exist without the designer, and the designer cannot exist as such, as a *designer*, without the design.

Cross has written extensively on "designerly ways of knowing" (1982, 2001, 2006). This terminology highlights the epistemic practices that distinguish design activity from activity in other disciplines, such as the sciences and arts. This epistemic focus is exemplified in texts such as *Designing with the Mind in Mind* (Johnson, 2010)*,* with its focus on Principles and Design Rules. What our analysis reveals, however, are what appear to be non-mentalistic, embodied stances of the whole designer in relation to the designed: Designing with the Body Embodied. These stances can thus be considered "designerly ways of *being*." As McNeill (2005, p. 99) suggests, "[b]y performing the gesture, a core idea is brought into concrete existence and becomes part of the speaker's own existence at that moment. … Following Heidegger's emphasis on being, a gesture is not a representation, or it is not only such: it is a form of being."

We conjecture that what most distinguishes designerly ways of being from other forms of being is the necessity for the designer to inhabit the first-person and third-person stances simultaneously. Designers must work with things in the world as objects with particular properties, properties that are revealed at arm's length, while at the same time experiencing oneself and one's designs from the inside, the experiencing self. Simultaneously attending to both the experience of the design and one or more characteristics of the design allows the

designer to navigate and experience a design space where different design choices could result in different user experiences. Design choices about the experience are not enabled by simply being in a first-person stance without attending to the design characteristics of the system under design, nor by simply being in a third-person stance without attending to the experience of using the design. Therefore, occupying this phenomenal stance can be considered perhaps the most *designerly* way of being.

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Endnotes

[1] This and the other names of participants in the design critiques are pseudonymized.

[2] We use the following notational conventions for the transcripts, standard in conversation analysis (see as well Appendix A of (Roth 2013)). Unless modified, all words are written with small letters. A period in parentheses indicates a pause of greater than 0.1 seconds in length. Descriptions in double parentheses are transcriber's comments. Colons indicate lengthening of a phoneme, about 0.1 second per colon. Square brackets in consecutive lines by different speakers indicate overlap of speech between these speakers. Speech within angle brackets preceded by 'p' (or 'pp') standing for 'piano' (or 'pianissimo') indicates lower (or much lower) speech volume than normal, as in '<<pp> scavenger hunt>.' Speech within angle brackets preceded by 'len' (or 'all') indicates *lento* (or *allegro*), i.e. slower (or faster) than normal speed. A word inside parentheses ending with '?' indicates difficulty in hearing the word on the recording and that the word in parentheses is the closest approximation. A question mark inside a parenthesis is a word that could not be approximated. Capital letters indicate speaker's emphasis. An equal sign at the end of a word indicates that there is no hearable pause prior to the next word uttered. Downward and upward arrows indicate the pitch jumping downward and upward. The punctuation marks ',?;.' indicate movement of pitch (intonation) toward the end of an utterance: slightly and strongly upward, slightly and strongly downward, respectively.